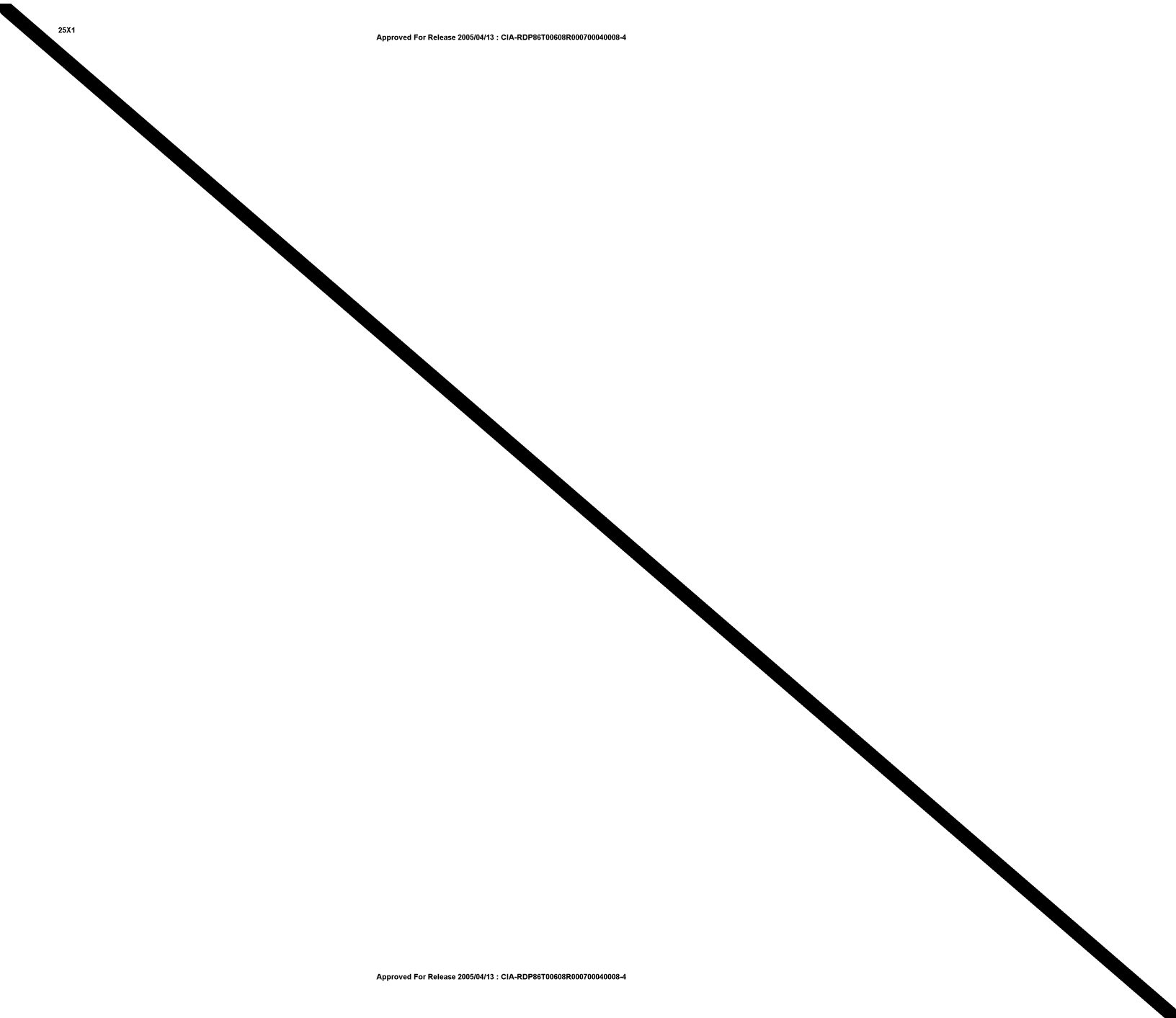

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TSWS-8/75
24 February 1975

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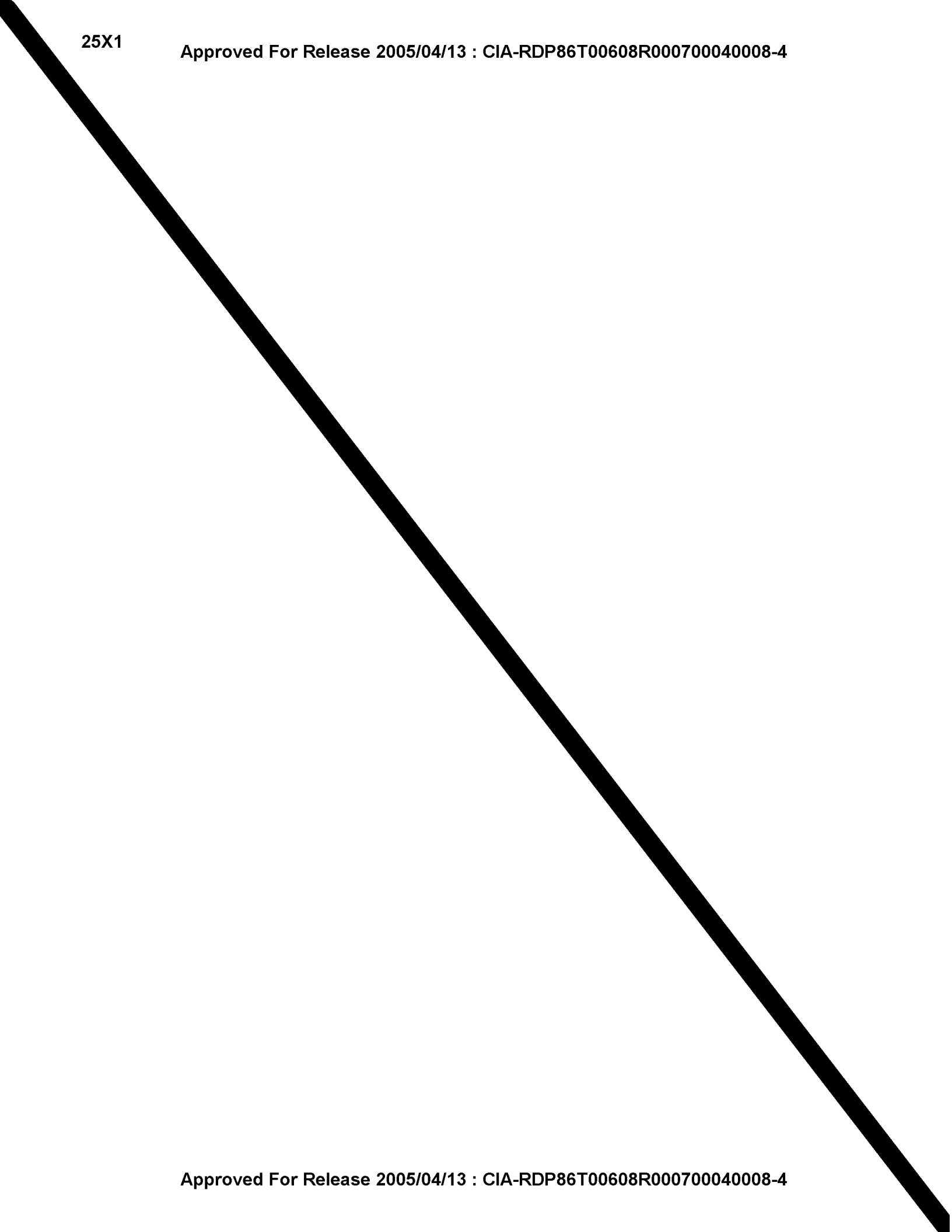

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WEEKLY SURVEYOR

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USSR AND EASTERN EUROPE

Poland has an experimental packet-switching computer communications network which is the first experimental step in the development of a domestic telecommunications system designed exclusively for data exchange. The principal part of the network is an automatic switching system which the Poles have named KASTOR. [redacted]

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[redacted]

Although the Soviets have developed and tested a side-scan sonar reportedly for geological investigations, such high-resolution devices can be used in searches for underwater objects [redacted] They also could be used to detect devices, such as line arrays and variable depth sonars, towed from ships [redacted]

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This is the first indication that the USSR may be producing large scale integration, integrated circuits and that ion implantation is being used in large scale integration fabrication. If so, the Soviets are possibly using their new Vesuvii commercial scale ion implanters which replaced the older series of machines which were unsuitable for the fabrication of reliable, reproducible devices. [redacted]

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[redacted]

The Soviet philosophy of strict adherence to established flight procedures is one of the major differences in the performance reliability of US and Soviet military pilots. As a consequence, Soviet pilots are not confident of their abilities, lack initiative and imagination and appear to avoid assuming responsibility for the conduct of their mission. [redacted]

The Soviets are interested in purchasing from the US two pilot training simulator systems for the L-1011 tri-star aircraft. The simulation technology could be employed immediately to upgrade existing flight trainers and improve the design of future trainers. Such improvements would very likely enhance Soviet military flight training programs that appear to be effective but which rely heavily on aircraft to complete the bulk of the training effort. [redacted]

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A leading East European researcher on NIEMR is organizing an international conference to write a model standard for human exposure to NIEMR. It is probable that recommended exposure standards emerging from this conference will be well below the

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[redacted]

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current US safety standard.

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JAPAN AND PACIFIC ISLAND

A new Singapore firm, Singapore Corn Products, Ltd., recently has perfected a milling process which refines whole kernel white corn into a palatable imitation of good quality medium grain rice. It is believed that the product is deficient in food value and may be completely unacceptable by the world rice consumers.

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MISCELLANEOUS

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Canada is optimistic in its expectation of 125,000 barrels of oil per day by 1978 from the Athabasca tar sands project. There are many engineering problems to be solved which include the extraction and upgrading of the tar sands. The commercial production of 125,000 barrels of oil per day will not be achieved for several years later.

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LIFE SCIENCES

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Standards Set by the New NIEMR Conference May Have Serious Economic Consequences for the US: Dr. P. Czerski, a leading East European researcher on the biological effects of nonionizing electromagnetic radiation (NIEMR), is organizing an international conference to write a model standard for human exposure to NIEMR. The conference which is to be held in Warsaw, Poland, in February 1976 [redacted] Czerski [redacted] recently published research reports

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have resolved ambiguities which have made it impossible to produce a realistic and definitive public health standard. He stated that the work of two Soviets, J. D. Dumanskiy and M. G. Shandala in Kiev, would make it desirable to consider a further reduction in the permitted amounts of irradiation, particularly where chronic exposure with a variety of modulated fields is involved.

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Comment: Publicity resulting from the recommendation by a distinguished group of internationally recognized authorities of a model standard well below the accepted US safety standard of 10 mW/cm^2 could cause an upsurge in US public concern about microwave and radiowave exposure. Compensation claims by former US government employees and union complaints on working conditions might be expected to increase greatly, and certain key manufacturing processes requiring HF radiation which are currently considered marginal according to current US standards undoubtedly would be modified.

Based solely on the work of Shandala and Dumanskiy, it seems doubtful that a broad consensus could be achieved for a model standard which is lower than the current Soviet standard of 0.01 mW/cm^2. While both are reputable scientists, their research is yet to be confirmed by other laboratories. On the other hand, there is a rapidly growing body of evidence to suggest that many biological effects may occur at levels well below 10 mW/cm^2. Considering this and the bias of the organizer, it is probable that recommended exposure standards emerging from this conference will be well below the current US safety standard of 10 mW/cm^2.

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AGROTECHNOLOGY AND FOOD RESOURCES

Singapore Firm Develops a New Food Product - Corn Rice: Singapore Corn Products, Ltd., a new Singapore firm, has recently perfected a milling process which refines whole kernel white corn into a palatable imitation of good quality medium grain rice. The only additive is water. It is claimed that corn rice costs less than one-third the price of top quality rice, and has a protein content triple that of the average rice. The firm hopes to interest the US in purchasing this new product for food aid purposes.

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Comment: If this imitation rice offers the advantages claimed over genuine rice, viz., more protein for less money, it could play an important role in feeding the hungry and malnourished people of developing countries. Radical innovations in food often have serious flaws, however, and this product is probably no exception. From the scientific standpoint the major reservation concerning this product has to be its actual food value for humans. Ordinary corn from which corn rice is processed is so deficient in the essential amino acids lysine and tryptophan that nearly half the protein available in corn is unusable by the human body. Since corn rice contains no additives this would seem to negate the nutritional advantage that it is claimed to have over genuine rice. Although rice contains less protein than corn, the amino acids in rice are better balanced.

Consumer acceptance also could be a big problem. Unlike wheat that is eaten in the form of bread or other baked products most rice is eaten in its grain form, and there are all sorts of preferences for different textures in genuine rice. Among the world rice consumers, a rice substitute may be completely unacceptable.

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BEHAVIORAL SCIENCES

Soviet Pilots Warned Not to Violate Flight Safety Rules: In a recent issue of Aviation and Cosmonautics, Soviet military pilots are reminded in some detail of the necessity for strict observance of established flight procedures. Even the slightest deviation from the prescribed flight parameters could result in failure or emergencies during a mission. On-board flight recorders continually monitor the pilot's performance from take-off until his return. Deviations from the flight plan and pilot errors are duly noted and analyzed by the ground commander.

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Comment: This Soviet philosophy of strict adherence to established flight procedures as noted earlier constitutes one of the major differences in the performance reliability of US and Soviet military pilots. This has resulted, for example, in pilots who are not confident of their abilities particularly when confronted with unique tactical or emergency situations, even after completing the training program. The constant on-board monitoring of performance results in pilots who tend to show little imagination and initiative and appear to avoid assuming responsibility for the conduct of their mission.

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Soviets Again Demonstrate Interest in Sophisticated US Flight Simulators: The Soviets have displayed an interest in purchasing from the US two pilot training simulator systems for the L-1011 tri-star aircraft. The system would include a movable cockpit, an environmental visual system, affiliated computers and a control station. They also wished to purchase two visual terrain simulators with a terrain model which was vertically immovable with dimensions of 13.4 by 4.8 meters. The maximum simulated speed of this simulator was to be 650 kilometers per hour. Queries also were made regarding the possible purchase of a cinematographic system with related optics for simulated terrain projections, a 6-degree-of-freedom cockpit motion system, and one, color, wide screen environmental visualizer.

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Comment: Although the Soviets could employ some of the simulation capabilities requested for airline operations, they also appear to be needed badly for military training systems. If the Soviets purchased the simulation technology requested, it could be employed immediately to upgrade existing flight trainers and improve their design of future trainers. Such improvements would very likely enhance Soviet military flight training programs even though they already appear to be effective.

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Soviet flight training simulator technology has not kept pace with the aircraft technology in the Soviet Union nor with the simulator technology in the West. Soviet military flight simulators are reportedly archaic and provide poor simulations of visual environment and cockpit motion cues. Two flight simulators which Soviet military instructor pilots reportedly have a high regard for are the ones used to simulate the Czechoslovakian L-29 and L-39 student training aircraft. These simulators have minimally satisfactory visual displays and cockpit motion cues. Soviet interest in obtaining US simulation training equipment is not surprising because, to date, Soviet flight training simulators incorporating three dimensional depictions of the visual surroundings or more than two, and possible three degrees of freedom of motion simulation for the cockpit have not been identified.

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PHYSICAL SCIENCES AND TECHNOLOGIES

Polish Packet-Switched Computer Communications Network May Permit Dramatic Expansion in Data Communications: Poland has had an experimental packet-switching computer communications network for approximately the last 18 months. The Institute of Telecommunications has been functioning as the network designer and manager, and commercial service has been offered [redacted] 25X1

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[redacted]

Comment: The Polish packet-switched computer communication network is the first experimental step in the development of a domestic telecommunications system designed exclusively for data exchange. The Poles are planning to install the first operational links of this telecommunications network in 1978 and installation is scheduled for completion by 1980. The principal part of the communication network is an automatic switching system which the Poles have named KASTOR.

The Poles were motivated to establish a data communication network by the number of terminals they had projected to be installed in the future. The Poles are projecting 35,000 to 100,000 terminals by 1985; an increase from 1,000 in 1975. A packet-switched communication network probably was selected because different types of computers can be attached to the network via interface processors. Packet operation is also an effective multiplex method for different data transmission rates. Similar rates of data communications growth have been projected by other East European countries, suggesting that they too may opt for packet-switched data communications network. [redacted] 25X1

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[redacted]

Soviets Develop and Test a Side-Scan Sonar for Geological Investigations: Soviet scientists at the All-Union Scientific Research Geological Institute and the Hydrographic Enterprise of the USSR Ministry of the Merchant Fleet have developed a high-resolution side-scan sonar for geological investigations; it was tested in the Baltic Sea in 1971-1972. The sonar reportedly operates at 8 kHz, has a beamwidth of 1 degree 30 minutes, a pulse length of 1 millisecond, and a range of 0.5 km. The reported resolution is 0.75 to 1.1 meters. Apparently, the device is mounted to the side of the vessel with a strut.

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Comment: This is possibly the third known model of a side-scan sonar in Soviet hands, but this is the first model for which the operating parameters are available. The Institute of Oceanology apparently developed one in 1968, but details of its operating characteristics were not reported. Additionally, an unsubstantiated report suggests that the Arctic and Antarctic Scientific Research Institute, Leningrad, recently acquired a US model illegally.

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The operating parameters of the most recent Soviet model are not significantly different from those of US models. The quality of the output, however, is probably inferior due to inferior auxiliary equipment; the resolution is probably not as good as the Soviets claim. Furthermore, the Soviets may well be experiencing difficulties with the device because it is rigidly attached to the ship's hull which causes noise problems as well as serious beam wandering problems.

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The side-scan sonar reportedly was developed for geological investigations; however, such high-resolution devices can be used in searches for underwater objects

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Promise of 125,000 Barrels of Crude Oil per Day from Canadian Tar Sands by 1978 is Unrealistic: Because the Canadian Alberta and Ontario governments have decided to financially support the development of the Syncrude Canada Ltd., tar sands project, Canada now expects 125,000 barrels of crude oil per day to be brought on stream by 1978 from the Athabasca tar sands.

1 [redacted]

Comment: The Canadians are optimistic in their expectation of 125,000 barrels of oil per day by 1978. This quota probably will not be met for several years after the system goes on stream in 1978. The engineering problems to be solved include the extraction and upgrading of the tar sands. The high reliability and productivity of the equipment required for commercial production of oil will not be achieved for several years later.

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Soviet New Series Ion Implanters Believed Used in LSI and MOS Fabrication: A. I. Shokin, Minister of the Electronics Industry, recently hinted that the Svetlana production association in Leningrad is fabricating large-scale integration (LSI) integrated circuits using ion implantation (IP) techniques. Shokin did not indicate which types of LSI circuits were being made, for how long, or in what volume.

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Comment: This is the first indication that the USSR may be producing LSI integrated circuits and that IP is being used in LSI fabrication. Since Svetlana is a vertically-integrated research, development, and production association, the LSI circuits may be in a developmental rather than series production stage. The LSI circuits are probably metal-oxide semiconductor (MOS) type, where sophisticated IP techniques offer the best advantages. Because Svetlana is active in bipolar research and development, however, bipolar LSI cannot be ruled out. Both LSI and MOS devices would be for computer memory and logic uses.

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If the LSI circuits actually are in production at Svetlana, then the Soviets are possibly using their new Vesuvii commercial scale ion implanters. The Vesuvii series replaces the older series of Soviet commercial IP machines which were unsuitable for the fabrication of reliable, reproducible devices.

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